

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
	<b>SECTION A: MAIN EQUIPMENT</b>				
1.00	Supply, Installation, Testing and commissioning of Horizontal / Vertical Split Casing duly insulated chilled water centrifugal pump sets for water recirculation complete with TEFC Sq. Cage induction motor IE-3, 1450 RPM synchronous speed suitable for 415 ± 10% volts, 50 Hz, 3 Phase AC supply with class "F" insulation, base plate, coupling guard, SS Shaft Grade 316, bronze impeller, factory fitted mechanical seal, flexible pipe connector at inlet and outlet etc. conforming to technical specification & as per following parameters. (Construction of Suitable size structurally adequate foundation as per OEM recommendation is in contractor's scope).				
	<b>Tertiary Chilled Water Pump Sets (2W+1S)</b>				
	Capacity of Each Pump GPM 780				
	Pump Head (Mt) 30				
	Motor HP 30.0 HP ( 22 KW)				
	Max Pump speed 1440 RPM				
	Pump Efficiency (Min) 85%	Set	3	371,267.00	1,113,801.00
2.00	<b>Horizontal Floor Mounted AHUs</b>				
	Supply, installation testing and commissioning of factory fabricated double skinned chilled water Air handling unit horizontal type fabricated out of extruded aluminium section with 0.8mm prepainted with PVC guard film on Galvanised steel sheet outside & 0.8 mm Aluzinc/ plain Galvanised steel sheet inside, 48+/- 2 mm panels with polyurethane foam having zero Ozone Depletion Potential substance insulation factory injected between them by injection molding machine with framework for each section should bolted together with soft rubber gasket in between to make the joint airtight, with Single/ Multiple SISW Fans with AMCA certified for air and sound with EC Motors suitable for operation on 415 volts + 10%, 50 Hz + 5% AC supply, 6 Row cooling coil coated with premium high performance chemical coating for corrosion resistance made of aluminium finned copper tube with coil section, pre - filter section with prefilters, fine filter section with MERV 13 filters as per specifications in extruded aluminium frame in supply after fan, stainless steel drain pan made out of 18 G sheet duly insulated with 19mm nitrile rubber and density of insulating material with diamond cut drain slope. The AHU panels shall be insulated with 48±2 mm thick & 40 Kg/m3 density PU foam. The motor & blower assembly shall be mounted on aluminium extruded section only. The complete AHU shall conform to specification and shall be complete with mixing box. The face velocity across cooling coil shall be limited to 152 MPM maxm. Units shall be with thermal break profile and Eurovent/ AHRI certified. The capacity of Air- handlers shall be as follows and other details as per specifications :				
	The desired rating of AHU shall be as follows:				
	Unit shall be certified as per AHRI 1350. Following is mandatory. 1) Leakage Class - CL1 2) Thermal Class - CT2 3) Thermal bridge - CB2 4) Casing deflection - CD4				
	Prefilters ; 50 mm thick ,ISO coarse grade with efficiency greater than 60% conforming to ISO 16890				
	Fine Filters 300 mm thick , bag type , ISO ePM1 with PM efficiency (50-70%) conforming to ISO 16890				
2.01	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 5500 CFM				
	Static Pressure : 60 mm wg				
	TR: 14				
	Coil Rows Deep : 6				
	Motor HP : 5.0	Nos.	10	328,972.00	3,289,720.00
2.02	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 5000 CFM				
	Static Pressure : 60 mm wg				
	TR: 12.5				
	Coil Rows Deep : 6				
	Motor HP : 5.0	Nos.	20	309,738.00	6,194,760.00
2.03	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 4500 CFM				
	Static Pressure : 60 mm wg				

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2.03	TR: 11.5				
	Coil Rows Deep : 6				
	Motor HP : 3.0	Nos.	3	301,574.00	904,722.00
2.04	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 4000 CFM				
	Static Pressure :60 mm wg				
	TR: 10				
	Coil Rows Deep : 6				
	Motor HP : 3.0	Nos.	10	291,691.00	2,916,910.00
2.05	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 3500 CFM				
	Static Pressure : 50 mm wg				
	TR: 9				
	Coil Rows Deep : 6				
	Motor HP : 3.0	Nos.	3	286,202.00	858,606.00
2.06	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 3000 CFM				
	Static Pressure : 50 mm wg				
	TR: 7.5				
	Coil Rows Deep : 6				
	Motor HP : 3.0	Nos.	7	282,229.00	1,975,603.00
2.07	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 2500 CFM				
	Static Pressure : 50 mm wg				
	TR: 6.5				
	Coil Rows Deep : 6				
	Motor HP : 2.0	Nos.	1	263,978.00	263,978.00
2.08	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 2000 CFM				
	Static Pressure : 50 mm wg				
	TR: 5				
	Coil Rows Deep : 6				
	Motor HP : 2.0	Nos.	1	245,318.00	245,318.00
2.09	<b>AHU (F/M) - Horizontal Type</b>				
	Air Quantity : 1500 CFM				
	Static Pressure : 50 mm wg				
	Coil Rows Deep : 6				
	TR: 4				
	Motor HP : 1.5	Nos.	1	232,969.00	232,969.00
3.0	Treated Fresh Air Units				
	Supply, Installation, Testing and commissioning of factory fabricated Double Skinned Chilled Water Air- handling unit fabricated out of extruded aluminium section with 0.8mm pre-coated Galvanised steel sheet outside & 0.8 mm plain GSS inside, 48+/- 2 mm panels with polyurethane foam having zero Ozone Depletion Potential substance insulation factory injected between them by injection molding machine with framework for each section should bolted together with soft rubber gasket in between to make the joint airtight , with Single/ Multiple SISW Fans with AMCA certified for air and sound with EC Motors suitable for operation on 415 volts + 10%, 50 Hz + 5% AC supply, 8 Row cooling coil coated with premium high performance chemical coating for corrosion resistance made of aluminium finned copper tube with coil section, pre - filter section with prefilters , fine filter section with MERV 13 and 150 mm thick chemical filters as per specifications ,stainless steel drain pan made out of 18 G sheet duly insulated with 19mm nitrile rubber and density of insulating material with diamond cut drain slope . The AHU panels shall be insulated with 48±2 mm thick & 40 Kg/m3 density PU foam.				

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	The 8 row deep coil shall be in two parts (4 row deep each with minimum 500 mm gap between them with access doors). The capacity of Air-handlers shall be as follows. The AHU shall be with one set of commissioning filter which shall be replaced with actual filter, drain connections with drain valve, descaling valves, auto air purge valve, necessary vibration isolation arrangement etc, complete as per specifications. Units shall be with thermal break profile and Eurovent/ AHRI certified . The capacity of Air- handlers shall be as follows and other details as per specifications :				
	Unit shall be certified as per AHRI 1350. Following is mandatory. 1) Leakage Class - CL1 2) Thermal Class - CT2 3) Thermal bridge - CB2 4) Casing deflection - CD4				
	Prefilters ; 50 mm thick ,ISO coarse grade with efficiency greater than 60% conforming to ISO 16890				
	Fine Filters 300 mm thick , bag type , ISO ePM1 with PM efficiency (50-70%) conforming to ISO 16890				
	chemical filters 150mm thick to arrest VOCs, Boron, H2S, So2 etc				
4.01	<b>TFA (F/M) - Horizontal Type</b>				
	Air Quantity : 8500 CFM				
	Static Pressure : 75 mm wg				
	Coil Rows Deep : 8( 4 +4)				
	Motor HP : 7.5	Nos.	3	320,225.00	960,675.00
4.02	<b>TFA (F/M) - Horizontal Type</b>				
	Air Quantity : 4500 CFM				
	Static Pressure : 65 mm wg				
	Coil Rows Deep : 8( 4 +4)				
	Motor HP : 5.0	Nos.	1	257,619.00	257,619.00
5.00	<b>ULTRAVIOLET GERMICIDAL IRRADIATION (UVGI) SYSTEM FOR AHU COOLING COIL</b>				
	Supply, Installation, Testing and Commissioning of Ultra Violet Germicidal Irradiations, (UVGI) System for Improvement of Indoor Air Quality and Energy Saving on AHU's Coil as per Specifications. The Average Life of UV lamps Shall be 9000 hrs. The UVGI System shall consist of UV lamps, reflector with its mounting assembly and control panel. The Control Panel shall be mounted outside the AHU and should Consist of ballast, hour meter, MCB, Indicating Light. The ballast and UV lamps shall be of instant start type. The Prices to include inter connected wiring between the UVGI lamps and panel. The ballast shall only be installed in a control panel and not inside the reflector assembly itself. System shall comply with UL standard 1995 as applicable to usage of UVGI system in HVAC equipment. The system shall also include prices for spare lamps for one replacement after 12000 hrs. of initial supply.				
5.01	AHU capacity : 8500 CFM	Sets	3	104,086.00	312,258.00
5.02	AHU capacity : 4500 CFM	Sets	1	65,680.00	65,680.00
6.00	<b>CEILING SUSPENDEED AHUs</b>				
	Supply, Installation, Testing and commissioning of factory fabricated Double Skinned Chilled Water Air- handling unit fabricated out of extruded aluminium section with 0.8mm pre-coated Galvanised steel sheet outside & 0.8 mm plain GSS inside, 48+/- 2 mm panels with polyurethane foam having zero Ozone Depletion Potential substance insulation factory injected between them by injection molding machine with framework for each section should bolted together with soft rubber gasket in between to make the joint airtight , with Single/ Multiple SISW Fans with AMCA certified for air and sound with EC Motors suitable for operation on 415 volts + 10%, 50 Hz + 5% AC supply, 6 Row cooling coil coated with premium high performance chemical coating for corrosion resistance made of aluminium finned copper tube with coil section, pre - filter section with prefilters , fine filter section with MERV 13 filters as per specifications ,stainless steel drain pan made out of 18 G sheet duly insulated with 19mm nitrile rubber and density of insulating material with diamond cut drain slope. The AHU panels shall be insulated with 48±2 mm thick & 40 Kg/m3 density PU foam.				
	Unit shall be certified as per AHRI 1350. Following is mandatory. 1) Leakage Class - CL1 2) Thermal Class - CT2 3) Thermal bridge - CB2 4) Casing deflection - CD4				
	Prefilters ; 50 mm thick ,ISO coarse grade with efficiency greater than 60% conforming to ISO 16890				

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	Fine Filters 300 mm thick , bag type , ISO ePM1 with PM efficiency (50-70%) conforming to ISO 16890				
6.01	<b>AHU-C/S</b>				
	Air Quantity : 1500 CFM				
	Static Pressure : 60 mm wg				
	Coil Rows Deep : 6				
	TR: 5				
	Motor : 2.0 HP	Nos.	1	137,017.00	137,017.00
7.00	<b>Fan Coil Units</b>				
	Supplying, installing, testing and commissioning of vertical / horizontal FAN COIL UNITS, blow through type, each complete with 3 row deep chilled water coil for capacities upto 1.5 & 2 TR and 4 row deep coil for 2.5 TR & 3 TR, one or more 3 speed centrifugal fans, cleanable metallic filters, main condensate drain pans, auxiliary drain pan, as described in specifications, casing, coil piping connections, through copper pipes, condensate drain connections, wiring, control wiring in conduit upto the Mtr.ostat boxes. All fan coil units shall be suitable for 220 + 6% volts, 50 cycles, single phase power supply. Fan Coil Units shall be of following refrigeration capacities as listed. Other details as per specifications				
7.01	Capacity : 3.0 TR Air Quantity : 1200 CFM	Nos.	8	36,905.00	295,240.00
7.02	Capacity : 2.5 TR Air Quantity : 1000 CFM	Nos.	6	35,721.00	214,326.00
8.00	<b>Pressurization Expansion Tank</b>				
	Supply, installation, testing and commissioning of Closed type pressurized <b>chilled water expansion tank ( Non ASME )</b> complete with necessary connection for piping, vent, valves and accessories. The requirement shall be as follows:				
	Accessories like centrifugal pumps etc. Shall be included in quoted price for satisfactory operation.				
	The tank shall be nitrogen precharged steel expansion tank with replaceable heavy duty butyl rubber bladder.				
	The tank shall have suitable sized inlet connection, drain along with valves for isolation/shutdown of system connection and drain and charging valve connection to facilitate the on site charging of the tank to meet system requirement.				
8.01	Expansion Tank as described above of capacity 1000 litres	Set	1	582,835.00	582,835.00
9.00	Supply, installation, testing and commissioning of <b>Centrifugal type Air Separator</b> complete with necessary connection for piping, vent, valves and accessories. The requirement shall be as follows:				
9.01	300 mm dia Air Separator- Main building Circuit	Set	1	132,373.00	132,373.00
10.00	<b>PROPELLER FANS</b>				
10.01	Supply, installation, testing & commissioning of 1Ph./3Ph. propeller fans, statically & dynamically balanced with pre-lubricated double ball bearing. 1Ph. fan to be capacitor start & capacitor run. Frames & Arms to be mounted on rubber bushing. Fans to be complete with gravity / backdraft dampers..				
	<b>Fan Dia      Speed in RPM      Input Power      Phase      CFM Free Flow</b>				
	305 mm / 12"      900      50 W      1Ph.      500-600				
	Motor Rating : 0.25 HP (1 Phase)	Nos.	31	36,090.00	1,118,790.00
10.02	457 mm / 18"      900      150 W      1Ph.      2290	Nos.	6	70,489.00	422,934.00
11.00	<b>VARIABLE REFRIGERANT VOLUME / FLOW SYSTEM</b>				
	Supply testing and commissioning of Air-cooled inverter based modular type VRF/ VRV system using R-410A refrigerant. This should be complete with interconnecting copper refrigerant piping with insulation, copper power cabling and control wiring in PVC conduit between indoor and outdoor . Power supply to suggested ODU shall be given at one point and further distribution shall be in scope of contractor including panel and cabling. This specifications is applied for all items wherever it is required.				
12.00	<b>INDOOR UNITS</b>				
	<b>Ceiling Mounted Ductable Type:</b>				

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	Supply, installation, Testing & Commissioning of Ceiling Mounted Duct Type Indoor units equipped with pre-filter, fan section with low noise fan, multispeed motor, coil section with DX coil, electronic expansion valve, outer cabinet, drain pan with drain pump kit, insulation, pipe connections etc. of various capacities including supporting arrangement with suitable vibration isolator as per specifications and drawings. The cost shall include the cost of 1 meter cable and plug top from Indoor Units to 15 A/3 pins socket. Indoor unit should have capability to provide cooling/heating as per seasonal weather changes.				
12.01	Capacity : 3.4 TR ( 1000 CFM)	Nos.	5	48,833.00	244,165.00
12.02	Capacity : 2.6 TR ( 800 CFM)	Nos.	5	43,401.00	217,005.00
	The units shall be suitable for 230V $\pm$ 6%, 50 Hz. supply & complete with electrical controls & panels.				
<b>13.00</b>	<b>VRF/VRV OUTDOOR UNITS</b>				
	<b>SUPPLY &amp; INSTALLATION OF VRV SYSTEMS (Variable Refrigerant volume)</b>				
	Note: VRV Units shall meet minimum efficiency requirements as per latest ECBC norms EER & IEER values as specified in ECBC to be met or as per latest BIS standards, if they are more stringent.				
13.01	16 HP Outdoor unit	Nos.	1	269,157.00	269,157.00
<b>14.00</b>	<b>REFRIGERANT PIPING (WITH INSULATION)</b>				
	Supply, installation, testing and commissioning of refrigerant pipe work with closed cell elastomeric nitrile rubber tubular insulation between each set of indoor & outdoor units as per specification, all piping inside the room shall be properly supported with MS slotted cable trays & all external piping shall run in covered cable tray.				
14.01	28.6 mm O.D.(with 19 mm insulation)	Mtr.	20	1,135.00	22,700.00
14.02	22.2 mm O.D.(with 19 mm insulation)	Mtr.	12	886.00	10,632.00
14.03	19.1 mm O.D. (with 13mm insulation)	Mtr.	12	725.00	8,700.00
14.04	15.9 mm O.D.(with 13mm insulation)	Mtr.	32	603.00	19,296.00
14.05	12.7 mm O.D.(with 13mm insulation)	Mtr.	20	478.00	9,560.00
14.06	9.5 mm O.D.(with 13mm insulation)	Mtr.	18	339.00	6,102.00
14.07	6.4 mm O.D.(with 13mm insulation)	Mtr.	10	251.00	2,510.00
<b>15.00</b>	<b>CONDENSATE DRAIN PIPING WITH U TRAPS</b>				
	Supplying, hanging & fixing of following items as per approved drawings, schedule and specifications. The contractor is to do the supports as per the drawing. Supports of drain pipe shall be installed using high Quality GI Slotted Channels, Saddle Nuts, Threaded Rods, Nuts, Washers, Rubber Lined Clamps etc. All piping shall be installed in a perfect straight line.				
	Drain water piping of hard CPVC (industrial grade) as required and as specified complete with bends, reducers, tees, flanges etc. as required and with 9 mm thick closed cell elastomeric. Thermal conductivity max. 0.037 W/(m*K) @ +20 Deg C shall be considered for selection of insulation material with density of 55 Kg/cubm. All related works including Cutouts, Sealing of Cutouts, Connections to traps etc for completion of drain connections to Toilets, External Gully Traps, U traps etc shall be included and the same shall be done up to the satisfaction of EIC.				
15.01	25mm dia.	Mtr.	20	378.00	7,560.00
15.02	32mm dia.	Mtr.	30	500.00	15,000.00
<b>16.00</b>	<b>Ref. / Y-JOINTS / HEADERS (PAIRS)</b>				
	Supply, installation of imported fittings, Y-joints and headers etc complete in all respect.	Nos.	5	9,086.00	45,430.00
<b>17.00</b>	<b>VRV/ VRF CENTRAL CONTROLLER (I TOUCH) MANAGER</b>				
	Supply, installation and commissioning of VRV/VRF central controller featuring an array of simple, useful system management functions for added value and shall be touch type and complete in all respect including control wiring, interface module.	Set	1	201,844.00	201,844.00

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<b>18.00</b>	<b>AIR COOLED SPLIT A/C DUCTABLE TYPE</b>				
	<p>Supply, Installation, Testing, Commissioning of inverter Ductable Split Air-conditioner (Indoor &amp; Outdoor) complete with CFC free refrigerant R 32 , Copper Ref. Piping, UPVC drain Pipe Density not less than 10kg/m3 complete with 9 mm thick nitrile rubber insulation, electrical connection, with individual Remote Control TheMtr.ostat for each indoor unit, power cable communication cable etc. , Ms stand for outdoor unit &amp; all other accessories which is required commission the unit as per specification &amp; drawings. The Refrigerant and Drain Pipe shall be concealed in the wall by cutting the same and making good after installation and testing. Alternatively these pipe can be installed on the surface of the wall in durable looking GI heavy gauge box duly painted to match the colour of the wall as per the requirement of the client .</p> <p>Refrigerant copper piping with fitting duly insulated with 19/25 mm thick closed cell Class O elastometric nitrile rubber tubular insulation of minimum density 40-60 kg/m3 between each set of indoor &amp; outdoor units as per specification. All copper tubes shall be coated with transparent anti corrosive primer before insulation. Covered Cable tray should be used for exposed refrigerant copper piping and tightened with self threaded screw.</p> <p>TheMtr.al conductivity 0.035w/m deg C at 0 degC. Temperature range -40 to 105deg C.</p> <p>Insulation duly mechanically protected with factory laminated glass cloth</p> <p>Note :</p> <p>Indoor unit capacity may be vary as per manufacturer standard. For calculated CFM please refer our split unit schedule attached in the tender document.</p> <p>The vendor should quote with refrigerant pipe and drain pipe (as per site conditions) and all accessories required for installation, or as directed by the PMC/client.</p> <p>HVAC contractor is advised to provide the units with sequencing arrangement.</p>				
18.01	Capacity : 5.5TR (2000 CFM)	Set	1	87,894.00	87,894.00
<b>19.00</b>	<b>FANS</b>				
<b>20.00</b>	<b>CENTRIFUGAL FAN SECTION FOR TOILET EXHAUST(FLOOR MOUNTED)</b>				
	<p>Supply, installation, testing, commissioning of, double skin with 0.80 mm thick GI Sheet and 0.80 mm thick prepainted GI sheet casing consisting of ,25 mm thick PUF insulation panel, Fan section consist of Centrifugal Fan, backward curved, DIDW, consisting of TEFC motor 415 +/- 10% volts, 3 Phase, 50 Hz, drive arrangement, common frame for fan and motor with metallisk vibration isolator. Fan-motor assembly (as whole) shall be statically &amp; dynamically balanced. casing with inspection window, fire rated double flexible connections on fan mounting arrangement, VCD at outlet belt driven, slide rails etc. Motor shall confoMtr.ing to efficiency grade IE 3. Complete as per detailed specification and drawing. Fan sections shall be suitable for outdoor duty. Motor suitable for VFD Vibration isolators, Fire retardant &amp; water proof flexible connection between fan outlet &amp; duct shall be made of Silicon coated glass fabric having 250 degree / 2 hour fire rating (Max. fan outlet velocity 10m/sec.).</p> <p>Fans, forward /backward curved, DIDW, shall be licensed to bear the AMCA Air and Sound Certified Ratings Seal. The test standard used shall be ANSI/AMCA 210-85, ANSI/ASHRAE Standard 51-1985 "Laboratory Method of Testing Fans for Rating" and AMCA 300 "Reverberant Room Method for Sound Testing of fans".</p> <p>Total fan efficiency should not less than 70%.</p> <p>Cost of Supporting arrangement as per approved shop drawing should be included in the above cost of equipment installation.</p>				
	Static pressure and Motor Rating : The Indicated static pressure and motor rating is only provisional. Contractor to calculate static pressure based on final approved construction drawing and pressure drop of finalized Equipment / Items and submit for review / approval to the consultants. The procurement shall be processed only after duly verification / approval of calculation and selection from the consultants.				
	Fan Sound level should not be greater than 70 dBA @ 1 meter from any side				
20.01	Capacity : 6500CFM, SP: 40mm wg, Motor (HP) : 3.7 Kw (2 W+2S)	Set	4	94,751.00	379,004.00
<b>21.00</b>	<b>LIFTWELL PRESSURISATION FANS</b>				
	Fire rated axial Fan (In case of emergency).				

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	Supply, installation, testing and commissioning of direct driven long casing (Motor should completely be accommodated inside the fan casing) fire rated Vane axial flow fans, Motor suitable for installing in any position in Horizontal or vertical with adjustable pitch blade, MS / high duty GSS long Casing , cast aluminium alloy impeller complete with TEFC Sq. Cage Induction type IE 2 motor suitable for 415 volts $\pm$ 10%, 50Hz $\pm$ 3 %, 4 Pole, three phase A.C supply of fire rated class "H" insulation motor's winding with support, mountings, vibration isolators, fire retardant flexible canvass connector 150 mm deep with 25 mm slack at Outlet etc. Quoted rate shall be including of Vibration Isolator to commission the Axial Flow Fan. The fans shall be AMCA certified for Air & Sound performance as per AMCA 210 & 300 & all offered fans pitch angle shall be AMCA Certified & Listed on AMCA website (Interpolation of pitch angle shall not be acceptable). Fan Efficiency Grade ( Min FEG 71, lesser is not acceptable). Thickness of the casing shall not be less than: For Dia (300 to 650) mm – 2mm, Dia (700 to 1140) mm – 3 mm, Dia (1200 to 1400) mm – 4mm & Dia 1600 – 5 mm. All fans after assembly shall be dynamically trim-balanced to ISO1940 and AMCA 204/3 - G2.5 quality grade. In vane axial fans vanes should be integral part of fans (vaness as accessories shall not be acceptable). Fan should be fire rated type suitable for 250 Deg @ 2 Hours and should be tested and certified for 250 Deg C for 2 hour in accordance to standard 'BSEN12101-3:2015 from any equivalent internationally recognized fire laboratory (Fan fire certificate should be available on the website of respective laboratory for the online verification). The same make of motor should be supply which have been used during the testing of the fans in the fire laboratory, same make of the motor should be mentioned in the fire certificate.				
	Sound level of fans should not exceed 83 DB(A)@ 3 meter (Room Condition). In case of not achieving sound , attenuator has to be added. Outlet velocity of the fans should not exceed 16 m/s. Maximum fan RPM should be 2900 till capacity 5000 CFM. Maximum fan RPM should be 1450 for capacity 5001 CFM to 32000 CFM. Maximum fan RPM should not be exceed 950 for capacities above 32000 CFM.				
	Emergency Operation				
21.01	11000 CFM ; SP 32 MMWG; HP : 5.0	Set	3	156,112.00	468,336.00
<b>22.00</b>	<b>PRECISION AIR CONDITIONERS DX UNIT FOR SERVER ROOM:</b>				
	Supply, Lifting, Shifting installation, testing and commissioning of DX/CHW as mentioned below TYPE Coil, MICROPROCESSOR BASED PRECISION A/C UNIT, top/bottom discharge as per site , complete with air cooled condenser, The unit includes scroll compressor, Electronic Expansion Valve, evaporator coil with hydrophilic coating, SS Drain Tray, EC brushless motor, plug type variable speed backward curved centrifugal blower, multistage electric heater, humidifier and vibration isolator. The cooling section should be made by a self-supporting structure of hot-dip galvanized steel; along the whole perimeter "double skin" panels are present with internal 30 kg/m <sup>3</sup> glass wool insulation density and 20 mm thickness. The panel should be classified as A1 according to EN13501 standard - fire reaction classes. The outer panels and the portions of the structure visible from the outside should be painted with epoxy powder colour with textured surface finish. Motor shall be suitable for 400+10% volts, 50 cycles, 3 phase AC supply .Outdoor unit motor should be with IP-54 protection and should be weather proof. PAC shall have Fan speed controller inbuilt in PAC unit. Auto sequencing of the unit for equal run time should be integral part of the micro-processor and also hard wired to be provided by PAC supplier. The units should be equipped with pleated air filters, with filtration class G4 according to ISO Coarse 75% (ISO 16890-3; G4 - EN779) , high filtering surface and low pressure drop. The filters should be mounted inside the air handling section, on a galvanized steel frame and are disposable type (non-regenerable). The electrical panel should be positioned inside the unit, equipped with door locked by mains switch to cut power to the unit before accessing the internal components. The electrical panel should include the following for all units: - Mains switch - Circuit-breakers for power and auxiliary circuits - Contactors for power loads - Microprocessor control card - Terminal strip with labelling of all cables. Unit should operate on Power supply of 415VAC/3ph/50Hz;				
	Humidifier: In built Immersed Electrode Humidifier should be provided. The PAC microprocessor, the microprocessor controller should proportionally adjust the output steam, based on the humidification level required in the room, through the regulation of the current absorbed by the electrodes. It should also control all the operating phases of humidifier: water filling and discharge, periodic emptying cycle, viewing of operating status and alarm messages. There should be an option to select whether the control needs to be based on either relative or absolute humidity.			-	

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	Heater: In built electrical heaters should be provided to control heating and/or post-heating. The heating elements are made of AISI304 steel and have low surface temperature, spiral AISI304 steel fins featuring a safety bimetal thermostat. Heater should be modulating type Triac-controlled electric heaters such that it can follow the condition of the room with accuracy, thus improving efficiency in heating and post-heating operation.			-	
	The microprocessor control should comprise of a I/O unit to which the controlled and safety devices are connected, and an external graphic user display. The graphic terminal should be a minimum 7" touch screen panel with 65000 colour display for managing high quality images and advanced functions. The touch screen panel shall be designed for easier man-machine interaction by making the screen browsing more user-friendly.			-	
	The display is also supplied with a LED bar featuring different message-associated colours. The machine status can be viewed at any time without having to go close to the display. The microprocessor should manage the room temperature. The ventilation should have option to get controlled by modulation depending on the temperature of the return air flow/pressure controlled. The control should operate a chain of alarms on two levels of severity. The unit should be able to control of either relative or absolute humidity in the return line (only applies to units with the necessary sensor and/or humidifier); It should inherent a clock card for alarm log (100 alarms with FIFO logic) and a memory for the historicizing of the measured parameters. Serial communication cards using RS485 Connection via Modbus Protocol for integration with external supervisory systems and/or communicate in local network between other units for group/team management & should also have RJ45 port for IP communication, including a reading and writing Modbus TCP/IP. Supervision via WEB should be available with the RJ45 port. When the machine IP address is queried via web browser from any computer connected to the same local network to which the units are linked, access can be gained to the unit web page (password-protected access).			-	
	For each unit installation price shall be inclusive of Lifting & Shifting to the designated 3rd floor. Vendor to check the site and do the due diligence at their end to place the units at desired location. Also price to be inclusive of TPN (isolator) MCB/ MCCB, power cabling from MCB/ MCCB to indoor unit upto 5 Mtr.T per unit, MS powder coated adjustable height type Indoor Unit Stand, and Commissioning of the unit. Each unit shall have inbuilt sequential controller for operating unit in N+1 configuration. Water Leak Detection system shall be an integral part of each PAC.				
	For each unit installation price shall be inclusive of Lifting & Shifting to the designated 3rd floor. Vendor to check the site and do the due diligence at their end to place the units at desired location. Also price to be inclusive of TPN (isolator) MCB/ MCCB, power cabling from MCB/ MCCB to indoor unit upto 5 Mtr.T per unit, MS powder coated adjustable height type Indoor Unit Stand, and Commissioning of the unit. Each unit shall have inbuilt sequential controller for operating unit in N+1 configuration. Water Leak Detection system shall be an integral part of each PAC.				
	<b>PAC Unit with CHW coil of minimum 15 TR Total Cooling capacity( 1 W)</b>				
	Return Air Condition: 24 deg C / 50% RH				
	Ambient Temp : 43 Deg C				
	Airflow Rate: 6000 CFM				
22.01	Discharge Type : Top / Bottom	Set	1	1,509,799.00	1,509,799.00
	<b>PAC Unit with DX coil of minimum 15 TR Total Cooling capacity( 1 S)</b>				
	Return Air Condition: 24 deg C / 50% RH				
	Ambient Temp : 43 Deg C				
	Airflow Rate: 6000 CFM				
22.02	Discharge Type : Top / Bottom	Set	1	1,509,799.00	1,509,799.00
	<b>TOTAL OF SECTION A: MAIN EQUIPMENT</b>				<b>27,530,627.00</b>
	<b>SECTION - B, PIPING WORK.</b>				
<b>23.00</b>	<b>CHILLED WATER PIPING</b>				
	Supplying, laying/ fixing, testing and commissioning of following nominal sizes of chilled/condenser water piping plumbing i/c fabrication of bends / elbows, tees, reducers etc) inside the building (with necessary clamps, wooden/puf support, vibration isolators, primer/ enamel paint, fittings but excluding valves, strainers, gauges etc.) as per specifications and as required complete in all respect.				
	Note:-The Pipes of sizes 150 mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150 mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35 mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.				
23.01	250 mm dia MS Pipes	Mtr.	20	5,961.00	119,220.00
23.02	200 mm dia MS Pipes	Mtr.	20	4,913.00	98,260.00



S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
23.03	150 mm dia MS Pipes	Mtr.	40	3,241.00	129,640.00
23.04	125 mm dia MS Pipes	Mtr.	80	2,784.00	222,720.00
23.05	100 mm dia MS Pipes	Mtr.	40	2,333.00	93,320.00
23.06	80 mm dia MS Pipes	Mtr.	100	1,737.00	173,700.00
23.07	65 mm dia MS Pipes	Mtr.	150	1,499.00	224,850.00
23.08	50 mm dia MS Pipes	Mtr.	275	1,192.00	327,800.00
23.09	40 mm dia MS Pipes	Mtr.	245	975.00	238,875.00
23.10	32 mm dia MS Pipes	Mtr.	70	805.00	56,350.00
23.11	25 mm dia MS Pipes	Mtr.	30	705.00	21,150.00
<b>24.00</b>	<b>CHILLED WATER PIPING (FOR PRE-INSULATED PIPE)</b>				
	Supplying, laying/ fixing, testing and commissioning of following nominal sizes of chilled, of pre-insulated heavy MS pipe i/c accessories as bends, tees, reducers etc with homogeneous rigid CFC & HCFC-free polyurethane foam (PUF) insulation of relative thickness as per CPWD HVAC specification 2017 of min density 42+/- 2 kg/Cum, 90% minimum closed cell content, and outer surface having cladded by watertight, corrosion protected and UV resistant HDPE pipe of relative thickness, having minimum compressive strength of 2.7 kg/sqcm, and thermal conductivity of 0.02 W/mK etc complete as standard specification with all fitting as required (with necessary clamps, vibration isolators and fittings but excluding valves, strainers, gauges etc).				
	Note:-The Pipes of sizes 150 mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150 mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35 mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.				
24.01	250 mm dia MS Pipes (63 mm thick insulation) Jacket thickness-6.3 mm	Mtr.	10	10,310.00	103,100.00
24.02	200 mm dia MS Pipes (63 mm thick insulation) Jacket thickness-5.0 mm	Mtr.	10	10,310.00	103,100.00
24.03	150 mm dia MS Pipes (53 mm thick insulation) Jacket thickness-4.4 mm	Mtr.	40	5,838.00	233,520.00
24.04	125 mm dia MS Pipes (42 mm thick insulation) Jacket thickness-3.5 mm	Mtr.	80	4,624.00	369,920.00
24.05	100 mm dia MS Pipes (42 mm thick insulation) Jacket thickness-3.2 mm	Mtr.	138	3,796.00	523,848.00
24.06	80 mm dia MS Pipes (42 mm thick insulation) Jacket thickness-3.0 mm	Mtr.	100	2,961.00	296,100.00
24.07	65 mm dia MS Pipes (39 mm thick insulation) Jacket thickness-3.0 mm	Mtr.	160	2,813.00	450,080.00
24.08	50 mm dia MS Pipes (37 mm thick insulation) Jacket thickness-3.0 mm	Mtr.	275	2,672.00	734,800.00
<b>25.00</b>	Supplying, fixing, testing and commissioning of BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/ hot water circulation as specified in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
25.01	300 mm dia Valves	Nos.	2	17,782.00	35,564.00
25.02	200 mm dia Valves	Nos.	6	15,134.00	90,804.00
25.03	150 mm dia Valves	Nos.	4	8,052.00	32,208.00
25.04	125 mm dia Valves	Nos.	2	7,362.00	14,724.00
25.05	100 mm dia Valves	Nos.	6	6,416.00	38,496.00
25.06	80 mm dia Valves	Nos.	8	4,683.00	37,464.00
25.07	65 mm dia Valves	Nos.	2	4,377.00	8,754.00
25.08	50 mm dia Valves	Nos.	70	3,990.00	279,300.00
23.09	40 mm dia Valves	Nos.	34	3,383.00	115,022.00
25.10	32 mm dia Valves	Nos.	8	2,565.00	20,520.00
<b>26.00</b>	Supplying, fixing, testing and commissioning of Check valves with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/ hot water circulation as specified in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
26.01	200 mm dia Valves	Nos.	3	14,004.00	42,012.00
<b>27.00</b>	Providing and fixing in position the following ball valves duly insulated as per specifications				
27.01	32 mm dia Valves (Ball Valve)	Nos.	14	1,754.00	24,556.00
27.02	25 mm dia Valves (Ball Valve)	Nos.	1	1,139.00	1,139.00
<b>28.00</b>	Providing and fixing in position the following ball valves with Y-strainer duly insulated as per specifications				
27.01	32 mm dia Valves (Ball Valve with Y-strainer)	Nos.	14	3,459.00	48,426.00
27.02	25 mm dia Valves (Ball Valve with Y-strainer)	Nos.	1	2,953.00	2,953.00

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
<b>28.00</b>	Supplying, fixing, testing and commissioning of BALANCING VALVE WITH BUILT IN MEASURING FACILITY with CI body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating for chilled / hot water circulation as specified.				
28.01	300mm dia Valves	Nos.	1	76,783.00	76,783.00
28.02	150mm dia Valves	Nos.	2	33,281.00	66,562.00
28.03	125mm dia Valves	Nos.	1	25,585.00	25,585.00
28.04	100 mm dia Valves	Nos.	3	19,215.00	57,645.00
28.05	80 mm dia Valves	Nos.	4	13,307.00	53,228.00
28.06	65 mm dia Valves	Nos.	1	11,910.00	11,910.00
28.07	50 mm dia Valves	Nos.	35	10,377.00	363,195.00
28.08	40 mm dia Valves	Nos.	17	7,358.00	125,086.00
28.09	32 mm dia Valves	Nos.	4	10,459.00	41,836.00
<b>29.00</b>	Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer for chilled / hot water circulation including insulation as specified.				
29.01	200 mm dia Strainer	Nos.	3	48,050.00	144,150.00
29.02	80 mm dia Strainer	Nos.	3	9,549.00	28,647.00
29.03	65mm dia Strainer	Nos.	1	7,693.00	7,693.00
29.04	50 mm dia Strainer	Nos.	34	5,694.00	193,596.00
29.05	40 mm dia Strainer	Nos.	17	4,251.00	72,267.00
29.06	32mm dia Strainer	Nos.	4	2,790.00	11,160.00
<b>30.00</b>	<b>Pressure Independent Balancing cum Control Valve</b>				
<b>a)</b>	<b>Pressure Independent Balancing cum Control Valve for smaller Air Handling units 15 to 25 mm</b>				
	Supply, Installation, testing and commissioning of Pressure independent balancing cum control Valve. The valve must be usable with/or without actuator, either as a dynamic flow limiter or a pressure independent control valve. Direct flow measuring must be possible at all times with an accuracy tolerance of within $\pm 3\%$ . Flow measurement must be done across a cartridge comprising an integrated Venturi nozzle. The thermo electric actuator shall full authority and pre-setting of the valve must have no effect on the valve authority. Valve actuator housing shall be rated to IP 54. Valve Housing shall be made of hot stamped DR brass CW602N CuZn36Pb2As rated for PN 25. Housing shall be configured for flow regulation unit accessibility. The flow regulation unit must consist of glass-reinforced polyphenylene sulphide. The flow regulation unit must be of cartridge type for easy accessibility, system flushing, replacement or maintenance.				
<b>b)</b>	<b>Pressure Independent balancing cum Control Valve for smaller Air Handling units 32 to 50 mm</b>				
	Supply, Installation, testing and commissioning of Pressure independent balancing cum control Valve. The valve must be usable with/or without actuator, either as a dynamic flow limiter or a pressure independent control valve. Direct flow measuring must be possible at all times with an accuracy tolerance of within $\pm 3\%$ . Flow measurement must be done across a cartridge comprising an integrated Venturi nozzle. The electro mechanical actuator shall full authority and pre-setting of the valve must have no effect on the valve authority. Valve actuator housing shall be rated to IP 40. Valve Housing shall be made of hot stamped DR brass CW602N CuZn36Pb2As rated for PN 25. Housing shall be configured for flow regulation unit accessibility. The flow regulation unit must consist of glass-reinforced polyphenylene sulphide. The flow regulation unit must be of cartridge type for easy accessibility, system flushing, replacement or maintenance.				
<b>c)</b>	<b>Pressure Independent balancing cum Control Valve for Large Air Handling units 65 to 150 mm</b>				
	Supply, Installation, testing and commissioning of Pressure independent balancing cum control Valve. Valve Housing shall be made of ductile iron ASTM A536-65T, Class 60-45-18 rated at no less than 4000 kPa static pressure and $+120^{\circ}\text{C}$ . The valve housing shall be for installation between flanges. The P/T plugs for verifying differential pressure shall be provided for all valve sizes. The flow regulation unit shall consist of stainless steel and hydrogenated acrylonitrile-butadiene-rubber and shall be capable of controlling flow with accuracy of $\pm 2\%$ of maximum flow or $\pm 5\%$ of controlled flow. The flow regulation unit shall be accessible for replacement or maintenance. The actuator shall be driven by a 24V AC / 30V DC motor and shall accept 2-10V DC, 4-20 mA, 3-point floating or pulse width modulation electric signal and shall include resistor to facilitate any of these signals. The actuator shall be capable of providing 2-10V DC or 4-20 mA feedback signals to the control system. The Valve actuator housing shall be rated to IP42.				
<b>30.01</b>	80 mm dia Valves	Nos.	3	75,495.00	226,485.00
<b>30.02</b>	65 mm dia Valves	Nos.	1	59,317.00	59,317.00
<b>30.03</b>	50 mm dia Valves	Nos.	34	38,423.00	1,306,382.00
<b>30.04</b>	40 mm dia Valves	Nos.	17	35,051.00	595,867.00
<b>30.05</b>	32 mm dia Valves	Nos.	4	18,873.00	75,492.00
<b>30.06</b>	25 mm dia Valves	Nos.	1	17,752.00	17,752.00

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
31.00	Supply, Installation, testing and commissioning of BTU Meter of following sizes. Accuracy : 10" to 36" (1% Full Scale), process connection : Male NPT, Housing electrical connection - 1/2" female NPT conduit connection without cable, temperature sensor - Hot tap Thermowell Temperature Sensor Assembly with 10 Foot, BACnet / Modbus communication with LCD display, temperature limits; Ambient: -20° to 160°F (-29° to 71°C); LCD -4° to 158°F (-20° to 70°C); Process: 15° to 250°F (-9° to 121°C); Storage: -40° to 185°F (-40° to 85°F) including required accessories complete in all respect as required.				
31.01	BTU Meter 300 mm	Nos.	2	377,476.00	754,952.00
32.00	Providing and fixing in position the industrial type pressure gauges with gun metal / brass valves complete as required.	Nos.	126	1,156.00	145,656.00
33.00	Providing & fixing in position the mercury in glass industrial type thermometers.	Nos.	118	1,008.00	118,944.00
34.00	Supply, installation, testing and commissioning of TWO WAY MOTORIZED ON/OFF VALVES provided with spring return function & fitted with modulating actuators in chilled water lines at each FCU. The actuator shall have required shut off capability of minimum 4 bar rating. The valves & actuators for FCU shall be compatible with Building Automation System. The valve shall be suitable for following pipe sizes: Item shall be complete with thermostat and wiring as required				
34.01	32 mm Dia Valves	Set	14	32,805.00	459,270.00
35.00	Supply, Installation, testing and commissioning of auto air vents of suitable approved sizes.	Nos.	50	4,609.00	230,450.00
36.00	<b>DRAIN PIPING</b>				
	Providing and fixing in position the following medium class MS pipe to required length and installed with screw joints including the necessary fittings duly insulated with 19 mm thick Class 'O' Nitrile Rubber Insulation and as per specifications.				
36.01	100 mm dia	Mtr.	50	2,096.00	104,800.00
36.02	50 mm dia	Mtr.	100	988.00	98,800.00
36.03	40 mm dia	Mtr.	50	723.00	36,150.00
36.04	32 mm dia	Mtr.	50	662.00	33,100.00
36.05	25 mm dia	Mtr.	50	523.00	26,150.00
	<b>TOTAL OF SECTION B</b>				<b>10,881,205.00</b>
	<b>SECTION - C, AIR DISTRIBUTION</b>				
37.00	<b>DOUBLE WALLED SPIRAL OVAL DUCT</b>				
	Supply, Installation, Balancing & Commissioning of factory fabricated pre insulated double walled spiral flat oval duct as per SMACNA with smooth streamline inner surface & standard spiral lock seams complete with elbows, vanes etc. including 19 mm thick class 'O' nitrile rubber insulation. The suspension arrangement shall be with wire rope hangers & stainless steel zip-clip arrangement as per specification & as required.				
37.01	0.63 MM (24 gauge) Galvanized Sheet Steel	Sqm.	1800	2,408.00	4,334,400.00
37.02	0.8 MM (22 gauge) Galvanized Sheet Steel	Sqm.	170	2,793.00	474,810.00
38.00	Supply, Installation, Balancing & Commissioning of factory fabricated pre insulated double walled spiral flat oval duct as per SMACNA with smooth streamline inner surface & standard spiral lock seams complete with elbows, vanes etc. including 13 mm thick class 'O' nitrile rubber insulation. The suspension arrangement shall be with wire rope hangers & stainless steel zip-clip arrangement as per specification & as required.				
38.01	0.63 MM (24 gauge) Galvanized Sheet Steel	Sqm.	1900	2,304.00	4,377,600.00
38.02	0.8 MM (22 gauge) Galvanized Sheet Steel	Sqm.	200	2,689.00	537,800.00
39.00	<b>FACTORY/ SITE FABRICATED DUCT</b>				
	Supply, installation, balancing and commissioning of factory/ site fabricated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.				
39.01	0.63 MM (24 gauge) Galvanized Sheet Steel	Sqm.	500	1,044.00	522,000.00
39.02	0.8 MM (22 gauge) Galvanized Sheet Steel	Sqm.	300	1,220.00	366,000.00
39.03	1.0 MM (20 gauge) Galvanized Sheet Steel	Sqm.	50	1,335.00	66,750.00
39.04	1.25 MM (18 gauge) Galvanized Sheet Steel	Sqm.	400	1,774.00	709,600.00

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
<b>40.00</b>	<b>VARIABLE AIR VOLUME (VAV)</b>				
	Supply, testing and commissioning of Variable Air Volume units (VAV) & shall be of the low velocity variable air volume boxes without re-heat coils. VAV shall be fitted with air volume regulator of the fully proportional type.				
	VAV Controller shall be with integral actuator, Differential pressure transmitter, thermostat with display.				
	The VAV Boxes shall be AHRI Certified. The boxes shall be with UL listed factory fitted, tested & calibrated controllers. The controls of the VAV and boxes should be manufactured by the same supplier. The VAV boxes shall be assembled, tested and calibrated at the factory before delivery to site.				
	VAV Boxes shall be supplied with all internal at attenuation treatment and acoustical damped casing necessary to achieve the required noise criteria. Casing shall be of 20G minimum fitted with a completely sealed. Access to all VAV Boxes must be from the underside only. Boxes shall be able to vary the air flow from 10%-120% over the rated air quantity. Air quantity limiters will not be accepted.				
	VAV boxes shall be pressure independent. The VAV boxes shall be of networkable type to hook up to BMS including necessary hardware/ software, control panel, transformer, controller, thermostat etc. The supply air velocity in the VAV Box should be limited to 1,100 FPM or 5.7-meter/sec..				
	VAV should supply along with power chord of approximately 2 Mtr including plug top.				
	Tenderer shall quote for boxes with 20% more CFM capacity than Designed CFM ratings, Communicable with BACnet MSTP Protocol as per specifications.				
	<b>AIR QUANTITY (CFM)</b>				
40.01	5500	Nos.		23,329.00	
40.02	5000	Nos.		22,491.00	
40.03	4500	Nos.	6	22,491.00	134,946.00
40.04	4000	Nos.		21,773.00	
40.05	3500	Nos.	2	21,773.00	43,546.00
40.06	3000	Nos.	1	21,175.00	21,175.00
40.07	2500	Nos.	1	21,175.00	21,175.00
40.08	2000	Nos.		20,697.00	
40.09	1600	Nos.		20,218.00	
40.10	1400-1500	Nos.	11	20,218.00	222,398.00
40.11	1400	Nos.		20,218.00	
40.12	1200	Nos.	12	20,218.00	242,616.00
40.13	600-650	Nos.	60	19,859.00	1,191,540.00
40.14	500-600	Nos.	32	19,859.00	635,488.00
40.15	400	Nos.	14	19,859.00	278,026.00
<b>41.00</b>	<b>Supply, testing and commissioning of constant Air Volume units (CAV) &amp; shall be of the low velocity constant air volume boxes .</b>				
41.01	500	Nos.	12	20,218.00	242,616.00
41.02	700	Nos.	12	19,859.00	238,308.00
<b>42.00</b>	Supply, Installation, Testing and commissioning of Gateway controller for VAV box integration with BMS system on BACNET/ IP protocol. Each gateway shall support integration of all the VAV Boxes & CAV Boxes above @ 90% loading on each communication bus. To connect all the VAV Controllers in suitable enclosure including all wiring, power supply unit and accessories complete. The Unit shall have a display. The gateway controller shall be provided with monitor and control through WEB interface module to connect Microsoft Network. The Gateway shall be expendable for future expansion. Required power controller supply unit to be included.	Nos.	1	70,584.00	70,584.00
<b>43.00</b>	<b>Grilles/Diffusers/Louvers/VCDs/FDs :</b>				
	Supply, installation, testing and balancing of square/round shape ceiling diffusers with removable core.				
43.01	Extruded aluminium construction, powder coated with volume control damper.	Sqm.	65	11,774.00	765,310.00
43.02	Extruded aluminium construction, powder coated without volume control damper	Sqm.	55	7,848.00	431,640.00
<b>44.00</b>	<b>Supply, installation, testing and commissioning of extruded aluminium powder coated supply / return air grills of approved shade and make</b>				
44.01	Supplying & fixing of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers as per specifications.	Sqm.	5	8,798.00	43,990.00

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
44.02	Supplying & fixing of powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers complete as required.	Sqm.	15	5,711.00	85,665.00
45.00	Supply, installation, testing and commissioning of GI volume control dampers for ducts & collars	Sqm.	90	6,809.00	612,810.00
46.00	Supply, installation and balancing of extruded aluminium powder coated fresh / exhaust air louvers complete with damper and aluminium wire mesh bird screen	Sqm.	5	8,695.00	43,475.00
47.00	<b>Fire Dampers</b>				
47.01	Supplying, Fixing, testing and commissioning of UL listed Fire damper with at least 90 minutes fire rating for supply air duct /main branch and return air path as and where required of required sizes i/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal complete as required and as per specifications	Sqm.	40	10,300.00	412,000.00
47.02	Supplying, Fixing, testing and commissioning of Motorised actuators, control panels & associated control wiring.	Set	145	9,613.00	1,393,885.00
	<b>TOTAL OF SECTION C</b>				<b>18,520,153.00</b>
	<b>SECTION - D, INSULATION</b>				
48.00	<b>Thermal Insulation (Exposed ducting)</b>				
	Supply & installation of external thermal insulation on ducts with approved sample of Aluminium foil faced XLPE duct insulation with density 25-30 Kg/cum, class 'O' complete as per specifications. All longitudinal and transverse joints shall be sealed with XLPE tape Exposed insulation shall be finally covered UV resistant paint/Starbond coating. The cost shall be inclusive of low VOC adhesive.				
48.01	25mm thick insulation	Sqm.	100	568.00	56,800.00
49.00	<b>Thermal Insulation (Internal ducting):</b>				
	Supply & installation of external thermal insulation on ducts with approved sample of Aluminium foil faced XLPE duct insulation with density 25-30 Kg/Cum, class 'O' complete as per specifications. All longitudinal and transverse joints shall be sealed with XLPE tape. The cost shall be inclusive of Low VOC adhesive.				
49.01	25 mm thick insulation for treated fresh air ducts in shafts and AHU rooms.	Sqm.	200	560.00	112,000.00
49.02	19 mm thick insulation for supply air duct in AC area and return air duct in non AC area.	Sqm.	550	466.00	256,300.00
49.03	13 mm thick insulation for return air duct in AC area.	Sqm.	500	370.00	185,000.00
50.00	<b>Acoustic lining (For Ducts)</b>				
	Supply & Installation of acoustic lining within supply air ducting using open cell XLPE insulation with 140-160 Kg/cum. density. All ducts shown cross hatched on the approved shop drawings shall be provided with acoustic lining as per the specifications. The cost shall be inclusive of low VOC adhesive.				
50.01	15 mm thick insulation	Sqm.	50	781.00	39,050.00
51.00	<b>Acoustic insulation for AHU rooms</b>				
51.01	Supply and Application of 50 mm thick acoustic/ the material lining of walls/ ceiling of AHU rooms using resin bonded fibre glass insulation of density not less than 32Kg/CuM as per the approved shop drawings and specifications. Quoted price shall be inclusive of GSS channel, metal screws, washers, fibre glass tissue, perforated aluminium sheet of 24G etc. as required for complete installation.	Sqm	4000	1,188.00	4,752,000.00
	<b>TOTAL OF SECTION D</b>				<b>5,401,150.00</b>
	<b>SECTION E : ELECTRICALS</b>				
52.00	<b>HVAC PLANT ROOM PUMP PANEL</b>				

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
	Design, manufacture, supply, assembly at site, installation, testing and commissioning of following cubical type panels made of CRCA sheet, base channel, doors & partitions complete with, Air Circuit Breaker, Moulded Case Circuit Breakers, meters, indicating lamps, current transformer etc. complete in all respects, insulated aluminium bus bars with heat shrinkable PVC sleeve in suitable bus bar chambers, interconnection, bus bar shrouds at joints, wiring, name plate, danger plate, earth bus etc. & comprising of compartments with hinged door for each feeder & its accessories, cable alley with hinged doors, bus chamber with bolted door etc. The panel shall be dust & vermin proof construction with rubber gasket and powder coated. The panel shall be free standing floor mounted type as per relevant drawing. The panel shall be completely modular and compartmentalised with FoMtr. 3 B Separation. The panel shall be manufactured as per IS-8623.				
	<b>Incoming</b>				
	1) Nos. 125A, MCCB				
	1Nos. Digital Voltmeter with selector switch and control SP MCB.				
	1 sets of Digital Ammeter & selector switch.				
	1 Sets of RYB phase indication lamps with control SP MCB.				
	1 Set of ON/OFF/Trip indication Lamps.				
	Outgoings				
	<b>3 Nos. Tertiary Chilled Water Pump (2W+1S) feeders each comprising</b>				
	30 HP Chilled water pump feeder				
	1 No. 50 Amps TPN MCCB - 25 KA				
	1 Set ON/OFF/Trip indication Lamps with protection fuse				
	1 Set Ammeter of suitable range with ICT				
	1 Set Start/stop Push Button				
	1 No. 30 HP VFD				
	Suitable for 2 Nos. 3 c x16 sqmm armoured aluminium conductor cable connection				
	<b>Bus Bars:</b>				
	150 A, 50 KA, TP+N aluminium busbar insulated with heat shrinkable sleeves and shall be colour coded. The neutral busbar shall be 50% rated.	Set	1	246,238.00	246,238.00
<b>53.00</b>	<b>LOCAL DISCONNECT PANELS FOR AHUs/ EXHAUST FAN SECTIONS AND LIFT WELL PRESSURISATION FANS</b>				
	Local disconnect panels wall mounted type made out of 2/1.6 mm thick steel sheet duly painted and comprising of following. The panel shall be compatible for integration with BMS system with required NO+NC contacts. Meters shall be digital type.				
	All outgoing shall be provided with stop/manual/auto selector switch to facilitate operation through BMS.				
	1 No. TPN MPCB with inbuilt over load relay of 25 KA breaking capacity				
	1 Set Phase indication lamps with protection fuse				
	1 No. ON indication lamp with protection fuse.				
	1 Set 'Start/ Stop' push button.				
	1 No. 24 Volt Transformer. (for AHU panels only)				
	1 No. Ammeter of suitable range with ICT				
	TP power contactors (AC3 Duty)				
	Voltmeter and ammeter with selector switch				
	Time delay relay for delayed automatic restart of air handling unit motor(0-180 Sec)				
	wiring for microswitch for starting/stopping the fan when fire damper closes				
	Necessary internal wiring as per specifications from equipment motor to panel shall be included.				
53.01	FOR AHUs OF 7.5 HP, 3 PHASE MOTOR	Set	1	65,608.00	65,608.00
53.02	FOR AHUs OF 5 HP, 3 PHASE MOTOR	Set	1	46,443.00	46,443.00
53.03	FOR AHUs OF 3.0 HP, 3 PHASE MOTOR	Set	1	30,763.00	30,763.00
53.04	FOR AHUs OF 2.0/1.5 HP, 3 PHASE MOTOR	Set	1	30,763.00	30,763.00
53.05	FOR toilet Exhaust Fan sections of 5.0 HP, 3 PHASE MOTOR	Set	2	46,443.00	92,886.00
53.06	FOR Lift well Pressurisation fans OF 5.0 HP, 3 PHASE MOTOR	Set	3	46,443.00	139,329.00
<b>54.00</b>	<b>SUPPLY &amp; FIXING OF COPPER ARMoured CABLES:</b>				
	Supply, fixing , testing and commissioning of following sizes of Power Cables, multi stranded copper conductor, XLPE Insulated, cores laid up, PVC tape / Extruded Inner sheathed, Armoured, LSZH at outer sheathed,1100V grade as per IS 7098(Part 1) 1988				
	<b>3 CORES</b>				
54.01	3 x 4 sq.mm.	Mtr.	400	548.00	219,200.00
54.02	3 x 6 sq.mm.	Mtr.	100	756.00	75,600.00
54.03	3.5 x 16 sq.mm.	Mtr.	75	2,327.00	174,525.00
<b>55.00</b>	<b>SUPPLY &amp; FIXING OF CONTROL CABLE</b>				

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
	Supply & FIXING of following sizes of Control Cables, Solid Copper conductor single stranded conductor, LSZH Insulated inner/external, cores laid up, PVC tape / Extruded Inner sheathed, Galvanised round wire armour, extruded PVC Type ST2 sheathed, 650V grade.				
55.01	2CX2.5 Sqmm	Mtr.	1200	321.00	385,200.00
	<b>CABLE JOINTING &amp; END TERMINATION</b>				
<b>56.00</b>	<b>TERMINATIONS FOR LT COPPER CABLES</b>				
	Supplying and making end termination with brass compression gland and copper lugs for following size of PVC insulated and PVC sheathed / XLPE copper conductor cable of 1.1 KV grade as required.				
56.01	3x 4 sq.mm.	Nos.	120	405.00	48,600.00
56.02	3 x 6 sq.mm.	Nos.	12	411.00	4,932.00
<b>57.00</b>	<b>EARTHING SYSTEM</b>				
57.01	Providing and fixing 25 mm X 3 mm G.I. strip on surface or in recess for connections etc. as required.	Mtr.	100	215.00	21,500.00
57.02	Providing and fixing 8 SWG dia G.I. wire on surface or in recess for loop earthing as required.	Mtr.	350	67.00	23,450.00
<b>58.00</b>	<b>Cable Trays</b>				
	Supply and installing of following size of (Hot dip) GI Perforated type cable trays (Galvanisation thickness not less than 50 micron) with perforation not more than 17.5% in convenient sections, joined with connectors including horizontal and vertical bends, reducers, tees, cross members, clamps, connection pieces and other accessories as required, duly suspended from the ceiling GI suspenders including GI bolts & GI nuts including fabrication, etc. complete as required.				
58.01	300 mm width X 50 mm depth X 1.6 mm thickness	Mtr.	20	931.00	18,620.00
58.02	150 mm width X 50 mm depth X 1.6 mm thickness	Mtr.	50	692.00	34,600.00
58.03	100 mm width X 50 mm depth X 1.6 mm thickness	Mtr.	200	646.00	129,200.00
<b>59.00</b>	Supply and installing of Weather proof isolator for VRV ODU 63 A complete in all respect as required.	Set	1	7,706.00	7,706.00
<b>60.00</b>	<b>INDOOR AIR QUALITY MONITOR</b>				
60.01	Supply, Installation, Testing & commissioning of IAQ Monitor to measure the levels of PM 2.5, VOCs, CO2, Temperature, Humidity on a real time basis. The IAQ Monitor shall be RS485 enabled and should be capable of getting connected with Wi-Fi. Units should have dedicated data browse i.e. sim card etc. The Monitor should be capable of sending the indoor air quality information on display Screen/Mobile/Workstation as per Client's requirement. The Monitor should indicate the quality of air through changing the colours as per the NAAQS standards and should meet the WELL building standards. Quoted price shall be inclusive of all necessary arrangement as required to make the unit proper functional. (LED Screen not included.)	Set	1	125,442.00	125,442.00
<b>61.00</b>	Supply , installation, testing and commissioning of Co2 Sensors interlocked with VAVs of TFA units for demand controlled ventilation	Sets	55	12,262.00	674,410.00
<b>62.00</b>	<b>BMS Interface</b>				
62.01	Necessary sockets and nipples with shut off valves for mounting sensors/transmitters on pipe line to interface the BMS system.	Lot	1	258,672.00	258,672.00
	<b>TOTAL OF SECTION E</b>				<b>2,853,687.00</b>
<b>63.00</b>	<b>PIPE INSULATION - F</b>				
	<b>Supplying &amp; fixing insulation on existing MS 'C' class pipe over exposed surface/underground of following sizes with 50 mm thick fire retardant thermocole ( polystyrene) molded pipe section of density 20 kg/cu.m after a thick coat of cold setting adhesive (CPRX compound) wrapping with 500g polythene faced hessian cloth, wire mesh, sand-cement plaster &amp; enamel painting two or more coat to give even shade after applying one coat of ordinary paint etc complete as required.</b>				
63.01	250 mm dia MS Pipes	Mtr.	20	1,565.00	31,300.00
63.02	200 mm dia MS Pipes	Mtr.	20	1,333.00	26,660.00
63.03	150 mm dia MS Pipes	Mtr.	40	633.00	25,320.00
63.04	125 mm dia MS Pipes	Mtr.	80	557.00	44,560.00
63.05	100 mm dia MS Pipes	Mtr.	40	491.00	19,640.00
63.06	80 mm dia MS Pipes	Mtr.	100	461.00	46,100.00
63.07	65 mm dia MS Pipes	Mtr.	150	421.00	63,150.00
63.08	50 mm dia MS Pipes	Mtr.	275	371.00	102,025.00

S. No.	Item Description	Unit	Qty	RATE Without GST	AMOUNT
63.09	40 mm dia MS Pipes	Mtr.	245	331.00	81,095.00
63.10	32 mm dia MS Pipes	Mtr.	70	310.00	21,700.00
63.11	25 mm dia MS Pipes	Mtr.	30	284.00	8,520.00
	TOTAL OF SECTION F				470,070.00
	GRAND TOTAL				65,656,892.00